INCREASING RATES OF SCREENING FOR FOOD INSECURITY IN A GENERAL PEDIATRICS TEACHING PRACTICE

A thesis submitted to the University of Arizona College of Medicine – Phoenix
in partial fulfillment of the requirements for the Degree of Doctor of Medicine

Ryan Romo
Class of 2019

Mentor: Kristi Samaddar, MD

Abstract

Food insecurity is a widespread and complex problem that affects approximately 21% of the nation's children. Demographic and socioeconomic data alone are not indicative of all families that are unable to access enough food to fully meet basic nutritional needs because of insufficient means. Screening for food insecurity is essential to identify these families so that they can be set up with resources to increase their access to resources.

This study assesses if the implementation of a two-question food insecurity screen at well child checks improves screening rates through prospectively looking at patients in PCH's General Pediatric Clinic. The validated screen includes the questions, "In the past 12 months, did you ever worry whether the food for you and your family would run out before you had enough money to buy more?" and "In the past 12 months were there times when the food for you and your family just did not last and there was no money to get more?" (Hagar et al. 2010). A family who answered positively to either of these questions was identified as food insecure and set up with resources. Three stages of data were analyzed for identification of food insecurity. These included: 1) previous practices, 2) following provider education, and 3) following integration of the validated screening tool in the EMR. 60 well child visits, 20 from each age group (<1yr, 1-4yr, and 5-11yr), were randomly selected and reviewed for each stage.

The integration of the screening tool into the EMR showed statistically significant improvement of screening rates and consequently more families were able to be identified as food insecure. This increase in identification improved overall quality of care by allowing providers to then share resources with families to gain access to food. The screen also has the potential to lower the cost of care through prevention of poor/fair health, hospitalizations, and developmental risks that are associated with FI in children. The next steps include identifying more resources to provide the families, improve follow up to see if the resources are actually being accessed, and encourage the use of the screen in other clinical settings seeing how not everyone presents for primary care.

Table of Contents

Introduction 1
Materials and Methods 4
Results 6
Discussion 12
Future Directions 13
Conclusions 14
References 15

List of Figures and Tables

Table 1. Screening Rates Data Summary

Figure 1. Screening Rates Graphic Illustration

Table 2. Screening Rates ANOVA

Table 3. Screening Rates Tukey's Honest Significant Difference

Table 4. Food insecurity Percentages

Introduction

The goal of this study is to analyze the current practices of identification of food insecurity in a select population in Phoenix Children's Hospital Ambulatory Pediatrics clinic and to create a tool that can enhance screening in the PCH General Pediatrics Clinic. The U.S. Department of Agriculture defines a food-insecure household as one in which, "access to adequate food is limited by a lack of money or other resources."[i] Food insecurity is a widespread and complex problem. It affects approximately 21% of the nation's children.[ii] Demographic and socioeconomic data alone are not indicative of all families that are unable to access enough food to fully meet basic nutritional needs because of insufficient resources. 60% of food-insecure families have incomes below the income eligibility cutoff for many child nutrition programs, but 30% of food-insecure households have incomes above this level, confirming that food insecurity is not always linked to poverty.[iii]

Other key factors contributing to food insecurity include unemployment, underemployment, immigration, large family size, households headed by single women, lower education, and parent separation or divorce. The American Academy of Pediatrics' Task Force on the Family suggests that pediatricians screen, assess, and appropriately refer for food insecurity.[iii] The identification of food insecure homes is as important, as food insecurity can negatively affect behavior and development and have a lifelong impact on the health of a child.[iii]

The USDA composed a Household Food Security Scale (HFSS) that is used by the Current Population Survey to monitor national food-security status annually, but this has clinical limitations due to its time consuming and complex scoring nature. A study done by Hagar et al showed that HFSS questions, "In the past 12 months, did you ever worry whether the food for you and your family would run out before you had enough money to buy more?" and "In the past 12 months were there times when the food for you and your family just did not last and there was no money to get more?" were the most positively answered questions in families that were in fact food-insecure.[iii] It was also demonstrated through this study that an affirmative response to either of these questions had a sensitivity of 97% and a specificity of

83% for food insecurity along with an increased risk of poor/fair child health, hospitalizations, and developmental risk.[iii]

A study done by Kleinman et al looked at the use and accuracy of a single-question screening tool asking, "In the past month, was there any day when you or anyone in your family went hungry because you did not have enough money for food?" and found this question to have an 83% sensitivity and 80% specificity. This study also demonstrated that families who were food insecure significantly underused all types of food assistance programs. [iv]

While this single item screen does have an acceptable sensitivity and specificity, there is the potential to miss food insecure families that experience stress related to uncertain access to food and not just the sensation of hunger.[iii] Data from the Community Childhood Hunger Identification Project[v,vi] and Children's HealthWatch[vii,viii] suggest that there can be negative consequences of food insecurity on child health and behavior before the child actually reaches the threshold for hunger.[iii]

This study assesses if the implementation of a two-question food insecurity screen at well child checks improves screening rates through prospectively looking at patients in PCH's General Pediatric Clinic. The validated screen includes the questions, "In the past 12 months, did you ever worry whether the food for you and your family would run out before you had enough money to buy more?" and "In the past 12 months were there times when the food for you and your family just did not last and there was no money to get more?" (Hagar et al. 2010). A family who answered positively to either of these questions was identified as food insecure and set up with resources. Three stages of data were analyzed for identification of food insecurity. These included: 1) previous practices, 2) following provider education, and 3) following integration of the validated screening tool in the EMR. 60 well child visits, 20 from each age group (<1yr, 1-4yr, and 5-11yr), were randomly selected and reviewed for each stage.

The objective of this study was to increase screening of household food insecurity by 50% by pediatric residents in a 6-month period. This objective will be met by increasing awareness that food insecurity is a problem and by using an evidenced based screening tool. This study will support and confirm that implementation of a validated screening tool for identification of food insecurity is effective. Additionally, through this study practitioners will be

taught the importance of screening for food insecurity; screening for food insecurity during well child visits will be increased; the current screening practices for food insecurity will be characterized; the previously unidentified and increasing food insecure population in this community of patients will be addressed; a catalog of existing food assistance resources will be assembled; and intervention strategies, program impact, and sustainability from the viewpoint of the PCH General Pediatrics Clinic and community agencies will be evaluated.

Materials and Methods

A. *Subject Population*: The subject population includes caregivers of all children attending well-child visits at PCH General Pediatrics clinic and Adolescent clinic.

B. *Sample Method*: Will review all well child visits for the assessment of food insecurity from a set date in 2015 to obtain 60 pre-electronic medical record (EMR) screening implementation total visits. The two validated screening questions from Hagar et al: "In the past 12 months, did you ever worry whether the food for you and your family would run out before you had enough money to buy more?" and "In the past 12 months were there times when the food for you and your family just did not last and there was no money to get more?", will be taught to current providers and then added to the EMR. Charts will be reviewed of all well child visits for an equal amount of time to obtain 60 post-provider education visits and 60 post-EMR implementation visits.

C. *Sample Size*: 180 charts; 60 pre-screening tool implementation, 60 post-provider education, and 60 post-EMR implementation.

D. *Study Design/Intervention*: A minimally revised set of questions based on two validated screening questions from Hagar et al: "In the past 12 months, did you ever worry whether the food for you and your family would run out before you had enough money to buy more?" and "In the past 12 months were there times when the food for you and your family just did not last and there was no money to get more?" asked in language of origin, will become part of the well-child visit protocol. To implement the intervention, brief educational sessions will be given to all residents (continuity, rotating, and general clinic), faculty, and ancillary staff working at PCH General Pediatrics clinic.

E. *Measures*: During the re-design of the clinic's inpatient EMR template for well child visits, two validated screening questions (Hager et al, 2010) will be embedded in screening protocol to prompt increased identification. These will measure clinic implementation of the intervention. The number of screens as well as positive responses to our screening questions will be measure.

F. *Data Collection*: Data collection performed via chart review.

G. *Analysis*: Statistical analysis will be a comparison of previous identification rates with those following increased education and addition of questions to EMR. Analysis will be conducted using a ANOVA single factor test and Tukey's HSD post hoc.

H. *Risks and Benefits*: There are minimal risks for participation in this study to the participants. Demographic information would be collected which would not involve any PHI for patients of the participating providers. The questions will be obtained during well child visits and linked to EMR, therefore the subjects will not be anonymous. This could potentially introduce some bias into the study, but will allow for follow-up with respondents.

The benefits of the study will be the development of a screening protocol for food insecurity and opportunities for resident and attending education regarding the value of this screening in our patient population. An additional benefit would be to connect families with resources in the community to obtain assistance with obtaining food.

Results

Data was collected for all three stages including: stage 1 (previous practices), stage 2 (post-provider education), and stage 3 (post-EMR integration). 60 well child visits, 20 from each age group (<1yr, 1-4yr, and 5-11yr), were randomly selected and reviewed for each stage. In stage 1, 2, and 3 the percentage of screens were 0%, 8.3%, and 70% (Table 1, Figure 1).

The ANOVA single factor test showed significant difference between the three groups with $p<0.001$ as seen in Table 2. Tukey's HSD post hoc test showed that there was a significant difference in the number of screens performed between Stage 1 and 3 and between Stage 2 and 3. There was no significant difference in screening between Stage 1 and 2 (Table 3). The raw percentages of food insecure families identified out of those who were screened can been seen in table 4.

Table 1: Screening Rates Data Summary

GROUPS	*TOTAL PATIENTS*	*NO. SCREENS*	*PERCENT SCREENED*
STAGE 1	60	0	0
STAGE 2	60	5	8.3%
STAGE 3	60	42	70%

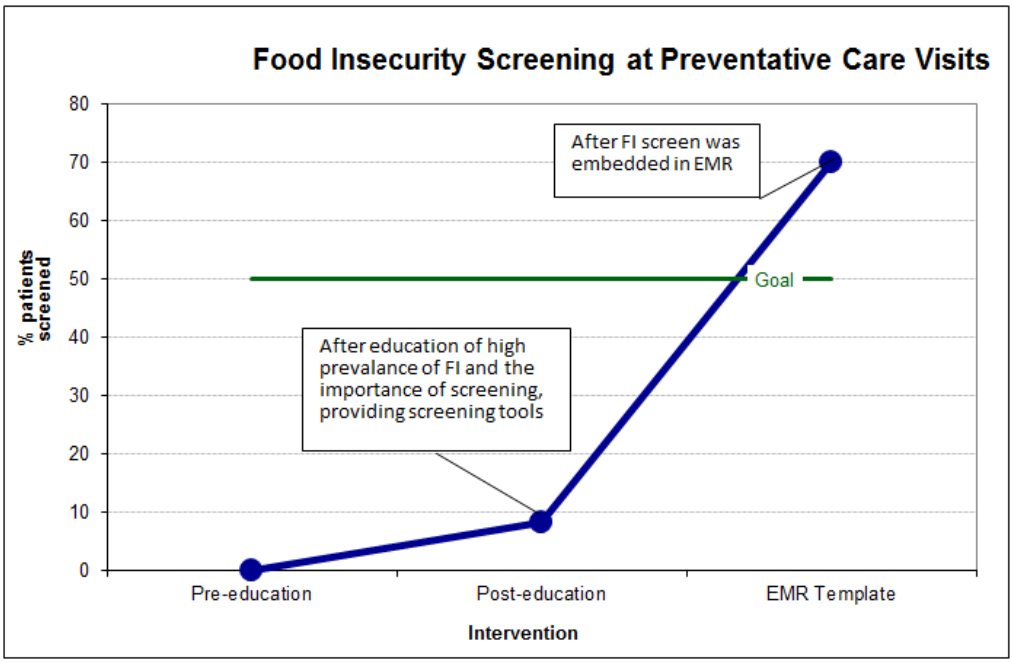

Figure 1. Screening Rates Graphic Illustration

Table 2: Screening Rates ANOVA

SOURCE OF VARIATION	*SS*	*DF*	*MS*	*F*	*P-VALUE*	*F CRIT*
BETWEEN GROUPS	17.544	2	8.77	90.36	**9.06E-28**	3.05
WITHIN GROUPS	17.183	177	0.01			
TOTAL	34.73	179				

Table 3: Screening Rates Tukey's Honest Significant Difference

COMPARISON	VALUE
STAGE 1 V STAGE 2	2.06
STAGE 1 V. STAGE 3	**17.41***
STAGE 2 V. STAGE 3	**15.34***

Critical value=3.31 for significance with df=177 and k=3
*value > 3.31 is statistically significant

Table 4: Food Insecurity Percentages

	PERCENT FI IDENTIFIED IN THOSE SCREENED
STAGE 1	0%
STAGE 2	20%
STAGE 3	9.52%

Discussion

Integration of the validated screening questions into the EMR is necessary for increasing screening rates in clinical practice. This can be seen through the fact that there was significant increase between previous practices (stage 1) and post-EMR integration (stage 3) as well as between post-provider education (stage 2) and post-EMR integration (stage 3). However, there was no significant difference between previous practices (stage 1) and post-provider education (stage 2), demonstrating that education alone does not suffice to increase screening. Having the screen embedded into the EMR provides staff with a tool that serves as a reminder and allows for quick, effective documentation. While it is unrealistic to not educate providers and house staff on new practices, these findings raise the question if training is even necessary or if simply adding the screen to the EMR with only a notification would lead to increased rates of screening as well.

Hagar et al, the main primary research article used to establish the two-question screen, stated that this screen has not been tested in a population of varying socioeconomic state or in families without young children. Conducting this research project at PCH allowed us to incorporate these populations and see if food insecurity screening still holds validity. However, an obstacle faced in this study was small sample size. While looking at the post-provider education group, only five families were screened with one positive response resulting in 20% prevalence, compared with post-EMR integration where 42 screens were done with four positive responses resulting in only 9.52% prevalence. While not a primary objective of the study, there was no statistically significant difference in prevalence of food insecurity found between the three stages. Therefore, the screen was not able to be validated. This could be because the screen does not work with such a diverse population, or more likely, that the data was simply insufficient to show its efficacy. What is clearly illustrated is that EMR integration of the screen successfully increased screening rates by over 50% in the PCH clinic. This is crucial as no patients were identified as food insecure previous to initiation of this study. Increased screening rates led to increased identification of families that needed help with access to food, and while not a statistically significant increase in identification, PCH providers were still able to provide in need families with resources.

Future Directions

The next steps include identifying more resources to provide the families, improve follow up, and encourage the use of the screen in other clinical settings seeing how not everyone presents for primary care. It would also be beneficial to look at a larger sample as the screen becomes a more stable and familiar component in the EMR. The possibility of care coordination looking into access the resources 6 months after families are identified as food insecure has been proposed as a follow up study. This project would go beyond just identification of food insecurity and investigate if information about local and state resources is enough to actually improves a family's access to food. If they do not access these resources within six months it would be reasonable to look into what obstacles prohibited the family from accessing the resources to improve their access to food.

Conclusions

This study seeks to shift current clinical practice by demonstrating that FI screens should be integrated into all well child checks to help increase identification of in need families. Education alone does not suffice while integration of the screening tool into the EMR showed statistically significant improvement of screening rates and consequently more families were able to be identified as food insecure. The integration of the screening tool into the EMR showed statistically significant improvement of screening rates and consequently more families were able to be identified as food insecure. This increase in identification improved overall quality of care by allowing providers to then share resources with families to gain access to food. The screen also has the potential to lower the cost of care through prevention of poor/fair health, hospitalizations, and developmental risks that are associated with FI in children.

References

[i] Food Security in the U.S.: Definitions of Food Security. *USDA ERS,* 2015.

[ii] Nord M, Andrews M, Carlson S. Household food security in the United States. *UDSA ERS*, 2008.

[iii] Hager ER, Quigg AM, Black MM, et al. Development and validity of a 2-item screen to identify families at risk for food insecurity. *Pediatrics.* 2010;126(1).

[iv] Kleinman RE, Murphy JM, Wieneke KM, Desmond MS, Schiff A, Gapinski JA. Use of a single-question screening tool to detect hunger in families attending a neighborhood health center. *Ambul Pediatr*. 2007;7(4):278-284.

[v] Murphy JM, Wehler CA, Pagano ME, Little M, Kleinman RE, Jellinek MS. Relationship between hunger and psychosocial functioning in low-income American children. J Am Acad Child Adolesc Psychiatry. 1998;37(2):163–170.

[vi] Weinreb L, Wehler C, Perloff J, et al. Hunger: its impact on children's health and mental health. Pediatrics. 2002;110(4).

[vii] Cook JT, Frank DA, Berkowitz C, et al. Food insecurity is associated with adverse health outcomes among human infants and toddlers. J Nutr. 2004;134(6):14321438

[viii] Rose-Jacobs R, Black MM, Casey PH, et al. Household food insecurity: associations with at-risk infant and toddler development. Pediatrics. 2008;121(1):65–72.